



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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GOVERNOR

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SECRETARY

December 18, 2007

NCDOT Policy for Mechanically Stabilized Earth Retaining Walls

By: Geotechnical Engineering Unit/Highway Design Branch

A mechanically stabilized earth (MSE) retaining wall for permanent applications is defined as a soil-retaining system with steel or geogrid tensile reinforcements in the reinforced zone and vertical or nearly vertical facing elements consisting of precast concrete panels or segmental retaining wall (SRW) units.

MSE wall systems with SRW units may not be used for "critical walls". Critical walls are defined as MSE walls with a design height greater than 35 ft (10.7 m) or MSE walls that support or are adjacent to railroads, interstate highways or bridges (abutments). The design height is defined as the difference between where the finished grade intersects the back and front of an MSE wall.

The standard Mechanically Stabilized Earth Retaining Walls Special Provision may be obtained from:

<http://www.ncdot.org/doh/preconstruct/highway/geotech/provnote/>

This provision requires the use of an MSE wall system approved by the Geotechnical Engineering Unit (GEU). The list of approved MSE wall systems with associated restrictions may be obtained from:

<http://www.ncdot.org/doh/preconstruct/highway/geotech/msewalls/>

The GEU will not approve MSE wall systems with SRW units and facing connections that do not use shear resisting devices such as bars, shear keys, pins, etc. or are fully dependent on friction between the units (and stone in unit core spaces) and reinforcement for connection strength, as determined by the GEU. A completed Highway Innovative Technology Evaluation Center (HITEC) report is required for all MSE wall systems approved by the GEU. To be considered for approval, send 5 hard copies and an electronic copy (PDF on CD or DVD) of current typical details, the HITEC report and documentation of any changes to the system since the HITEC report to:

Mr. Njoroge Wainaina, P.E.
State Geotechnical Engineer
North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, NC 27699-1589

Within 30 working days of receiving the details, HITEC reports and any associated documentation, the GEU will either conditionally approve the MSE wall system with or without restrictions or reject the system.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH, NC 27699-1589

TELEPHONE: 919-250-4088
FAX: 919-250-4237

WEBSITE: WWW.NCDOT.ORG/DOH/

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH, NC 27610

Conditional Approval

MSE wall systems with conditional approval are restricted to a design height of 20 ft (6.1 m) and an exposed face area of 5,000 ft² (465 m²) per MSE wall.

The conditional status of an MSE wall system will be reevaluated after satisfactorily completing a representative MSE wall that meets the following requirements.

- Design height exceeds 15 ft (4.6 m) for a horizontal distance of at least 150 ft (46 m) along the wall face
- Designed and constructed in accordance with the Mechanically Stabilized Earth (MSE) Retaining Walls Special Provision
- Movement monitored by an independent consultant during construction to 3 months after wall is subject to surcharge loads or movement stops, whichever is longer*
- Five hard copies and an electronic copy of an MSE wall system evaluation report submitted to the GEU (at the address above) with as-built wall plans and supporting calculations, monitoring results, a summary of MSE wall construction including color photographs and any comments or conclusions regarding the performance of the system

*Use a consultant prequalified by the NCDOT Construction Unit for structure movement monitoring work (work code 3125). Before beginning wall construction, submit a monitoring plan for review and acceptance describing proposed monitoring methods, locations and frequency.

The Department will determine satisfactory completion and whether to remove the conditional status for the MSE wall system after reviewing the evaluation report. MSE wall systems with conditional approval may be removed from the approved list at the Department's discretion for unsatisfactory work at any time or if the system is not used within 3 years.

If the conditional status of an MSE wall system with SRW units is removed, the MSE Wall Vendor will have the opportunity to develop a standard retaining wall as an alternate to the NCDOT Standard Gravity Retaining Wall. The GEU will coordinate with the vendor to review and implement the new NCDOT Standard Retaining Wall.

If any changes to an MSE wall system occur after a system is approved, submit documentation of the changes to the GEU (at the address above) for evaluation and to be included in the currently approved system. Failure to do so may result in suspension or removal of the MSE wall system's approval status.

The Federal Highway Administration (FHWA) has stated the following regarding the use of Load Resistance Factor Design (LRFD) for retaining walls.

All new culverts, retaining walls, and other standard structures on which States initiate preliminary engineering after October 1, 2010, shall be designed by the LRFD Specifications, with the assumption that the specifications and software for these structures are "mature" at this time.

While the current MSE wall provision does not require LRFD, NCDOT anticipates requiring LRFD for MSE walls in 2009.